
CHAPTER 4.0

COMMENT LETTERS AND RESPONSES



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STATE OF WASHINGTON
Geology and Earth

DEPARTMENT OF ECOLOGY

OLYMPIC REGION

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Letter 1

April 3, 2002

Mr. Gordon Gibbs
WSDNR
Olympic Region
411 Tillicum Lane
Forks WA 98331-9797

Dear Mr. Gibbs:

Thank you for the opportunity to review the draft environmental impact statement (EIS) for the Mats Mats Quarry Operation proposed by Glacier Northwest (Reclamation permit #70-010170). We have reviewed the draft EIS and have the following comments.

Shoreline Management

Rock mining activities having taken place historically does not obviate the requirement for a shoreline permit for the new proposal. It was documented that the mining operations would cease over the next five years. Neighboring residences are currently affected by the mining operation.

1

In a suburban designated shoreline area, proposed mining activities, which would include the importation of reclamation materials, will require a Shoreline Conditional Use permit. Associated offloading facilities, depending on their location and extent, would require a Substantial Development permit.

2

The draft EIS does not provide a clear description of uses/activities proposed in shoreline jurisdiction that would be associated with the proposed action or the limited mining option. The proposed action appears to intensify historical levels of mining and transport, plus add the new use of importing materials onto the site.

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In the final EIS, the scope and methods proposed for onsite transport of reclamation materials warrants considerably greater detail. Methods and facilities for moving the reclamation fill materials into place on site, once offloaded, are not described. This aspect of the operation will involve transport through the site of unspecified materials. Depending on machinery employed, whether trucks or conveyor belts or other systems, soils will end up falling in the water, intensifying dust levels, or spilling onto the ground.

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The source and type of fill proposed for reclamation is described in vague terms. The amount of expected fill is inexact. The statement is made repeatedly through the document that no impacts are anticipated. The materials and activities themselves are unclear, however, and so are the potential impacts. For example, stormwater conveyance systems, unclearly described in the draft EIS, could allow erosion or turbidity to become problematic in waters of Mats Mats Bay and/or Admiralty Inlet. Analysis related to both short and long-term impacts from reclamation materials should be strengthened.

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Reclamation activities, whatever their extent, are a new use that have not been "grandfathered" as part of the previous operation. The extent and associated impacts of all the proposed extension of mining activities are subject to public scrutiny and comment, per RCW 90.58.020, 130, and 900.

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Seawater Intrusion

This proposal is to mine the basalt down 60 feet below sea level directly adjacent to the Puget Sound. One of Ecology's concerns relates to ground water flow. Deepening of the pit, as proposed, likely would produce a drop in ground water levels south of the pit and this could lead to seawater intrusion. Deepening of a pit adjacent to the Puget Sound might also result in an in-filling of the pit with saltwater, and that too could act as a potential contaminant source of the aquifer located to the south. As most of the deep domestic wells south of the pit are completed in bedrock, these wells produce water from fractures in the rock. It is very difficult to predict how flow through these rock fractures would be changed if the quarry were deepened as proposed.

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The January 2002 draft EIS provides ample indications that the site geology is complex and capable of transmitting ground water. On page 3.1-2, number 4, for example, the draft EIS states, "The shale breaks are typically friable, with poor rock quality and the potential for allowing ground water seepage." Additionally, several high angle faults have been identified at the site. Slug testing of the exploration boreholes indicated hydraulic conductivity variability at the site, and a value of 10-4 cm for borehole EB-5, located at the southern extent of the proposed pit expansion. A tidal response was also detected in EB-33 located a few hundred feet south of the proposed expansion. The draft EIS suggests that these tidal fluctuations resulted from the transmission of pressure through incompressible rock, however, other possible explanations exist. Due to the many unknowns regarding how this site might react to the proposed expansion, it would be helpful if the applicant provided examples of similar existing mines close to salt water, which have not produced adverse seawater intrusion consequences.

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Portions of the draft EIS do propose monitoring, but much of this is inadequate. A bullet on page 3.3.15 states that "A supplemental hydrogeologic evaluation will be prepared if, during the course of mining, water seepage greater than 50 gallons per minute occurs at a single point, or if extensive, unmapped north-south trending lineations (faults) are encountered." It is unclear, however, whether 50 gpm is a proper threshold of concern or how such a seepage rate would be measured. It is also unclear what constitutes "extensive" unmapped lineations. Appendix IX of the draft EIS discusses the potential use of monitoring wells, however, several aspects of that proposal are also inadequate. For example, page 1 of this appendix calls for monitoring wells to be installed "at least to sea level". Many production wells currently in use south of the site are completed below sea level, however, and in order to protect these, monitoring wells would need to at least be as deep. Additionally, there is no point in monitoring chloride concentrations in wells completed at or slightly below sea level (as suggested), as the bottoms of the wells would not even penetrate the saltwater interface.

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The uncertainties regarding the potential impacts from this project are numerous, and this indicates that adequate ground water monitoring should occur regularly during the life of the pit, if the project does proceed. Ecology sees a number of problems with the current Appendix IX monitoring proposal, but at a minimum we suggest the following changes or additions: Monitoring should occur in several monitoring wells to be located just south of the pit and drilled at least as deep as the deepest production well now using this aquifer. One possibility would be to step up monitoring during and shortly after those times when the pit is being deepened, as opposed to maintaining this at the same rate throughout all of the mining operations. At a minimum, however, all monitored wells should have their water levels measured on a monthly basis, with quarterly sampling of chloride and nitrate concentrations. If cost is a limiting factor, monthly water-level monitoring could be conducted by mine staff, with quarterly verification by the consultant. The point of this monitoring would be to detect whether there was a drop in water levels below pre-determined thresholds, or any increases in chloride concentrations above natural background levels during the progressive expansion of the pit. If such exceedences did occur, further blasting would cease until the situation was analyzed and it was resolved whether additional deepening would degrade the aquifer and threaten ground water users to the south.

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With regard to selection of thresholds beyond which corrective measures would begin, the methods presented in Appendix IX are inadequate. The plan proposes that a drop in baseline water levels of 10 feet or an increase in baseline nitrate or chloride levels of 25% could occur before any action been taken (with the caveat that exceedences above WAC 246-290-310 maximum contaminant levels would also trigger action). The Ghyben-Herzberg relationship, however, indicates that the interface between fresh water and salt water occurs at a depth below sea level equal to about 40 times the height of the fresh

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water. As such, a 10-foot drop in the baseline static water-level theoretically would equate to a rise of about 400 feet in the midpoint of the zone of diffusion. Clearly this is too much change prior to corrective action. Similarly, waiting for a 25% increase in background chloride and nitrate concentrations is lax. In order to select proper thresholds, several years of initial data should first be evaluated. Depending on seasonal water-level fluctuations during that time, trigger mechanisms which compare water-level declines of even a few feet compared with those previous for that time of year may be appropriate. Similarly, if chloride and nitrate concentrations are extremely stable and/or chloride concentrations in any of the sampled wells are already initially high during the first few years, then increases of even 10% may be deemed sufficient for corrective measures. It is also recommended that at least some background water level and chloride and nitrate concentration data be collected from the existing private production wells located to the south, for comparison purposes in case problems do arise.

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Additional and significant problems with the Appendix IX monitoring proposal relate to proposed legal obligations, such as those discussed in Section 3 on page 4. To begin with, this section assumes that the Mats Mats Area Coalition will have the resources to hire a consultant if the mine operations create any problems. It would be much more equitable if the mine instead were to provide Jefferson County with the money to hire an independent consultant in advance, to review any reports submitted by Lone Star. Another dubious aspect of this section relates to the suggestion that Ecology select a consultant for purposes of determining the exceedences which can be attributed to mining activities, and subsequently that consensus between two out of three consultants (the latter two being those to be selected by Lone Star and the Mats Mats Area Coalition) would lead to some sort of binding situation. The problems with this suggestion are numerous. Firstly, Ecology does not have the authority, financial resources, or inclination to hire a consultant for this purpose, nor can it abdicate its responsibilities in this manner. Secondly, this entire section seems an acknowledgement of a high degree of uncertainty regarding the effects of this proposed mine expansion and an attempt to have Ecology and Jefferson County assume partial responsibility if things go wrong. Instead, the need for analyzing problems that arise and any follow up remediation needs to be placed squarely back upon the applicant. Additionally, it would appear that the corrective actions proposed in section 4 on page 4 of Appendix IX might be deemed inadequate by those land owners who would be potentially affected by the expanded mining operations. The reality is that it is very difficult to predict how flow through the rock fractures used by the domestic wells to the south might be changed, and it would seem that this section attempts to place many of the risks on these southern domestic neighbors.

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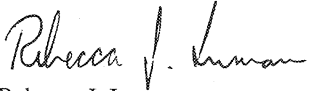
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If you have any questions regarding the comments related to Shoreline Management, please call Mr. Jeffree Stewart, an Ecology Shoreline Specialist, at (360) 407-6521. For clarification regarding the comments related to Seawater Intrusion, please contact Mr. Tom Culhane with our Water Resources Program at (306) 407-0297.

Sincerely,

A handwritten signature in cursive script, reading "Rebecca J. Inman".

Rebecca J. Inman
Environmental Coordination Section

EIS #020480

cc: Tom Culhane, SWRO
Kari Rokstad, SWRO
Opal Smitherman, SWRO
Jeffree Stewart, SWRO

Response to Letter 1

STATE DEPARTMENT OF ECOLOGY

1. Although there has been some question about the depth of mining covered by the DNR Surface Mining Reclamation Permit for the site, there is no known documentation suggesting that Northwest Aggregates, the previous operator, or any governmental agency, intended that excavation or transport of hard rock would terminate by a certain date. Please refer to response to comment 2 of this letter for a discussion on shoreline permit issues.
2. The *Proposed Action* does not propose to conduct any excavation or processing activities within the shoreline. As indicated on page 2-5 of the Draft EIS, the proposal does not include stockpiling or processing activities within the shoreline area.

The only mining-related activity within the shoreline would be the continued use of the two ramps located at the eastern edge of the site for barging. The Draft EIS indicates that no increase in the rate of mining is proposed; as under existing conditions, the rate of extraction would fluctuate with market conditions. The rate of transport depends on the rate of mining, and because no increase in mining rate is proposed, no increase in the intensity or rate of transport is proposed.

With respect to the importation of material for reclamation, the only materials that would be imported onto the site via barges would be clean soil for reclamation, which is an integral aspect of mining operations at the site. The importation of material for reclamation is not a new use. The unloading of reclamation material, as well as the loading of hard rock, have both occurred historically at the site, as part of the mining-related use of the barge-loading facility. For example, since 1995 a total of 64 barge deliveries of soil for reclamation were made to the site. The largest number of reclamation barge deliveries was made during 1995, with 24 deliveries to the site. Barges entering the site with reclamation soil typically leave with quarry rock; consequently, the use of the ramps for transporting reclamation material to the site generates little additional barge trips (please refer to the *Transportation* section for detail on barge trips under the *Proposed Action*). Please also note approximately 12 acres in the southern portion of the site has been reclaimed.

3. As indicated on page 3.8-9 of the Draft EIS, the proposal does not involve any new uses or physical development within 200 feet of the ordinary high water mark. There is no proposal to change the configuration or location of the two loading ramps or associated in-water structures or pilings. The proposal entails the continued use of these structures for mining-related activities. Refer to the Transportation section of this Final EIS for discussion on barge conditions at the site.
4. Comments acknowledged. The proposed reclamation would not necessitate additional employment or equipment. The off-loading and on-site distribution of clean soil for reclamation would utilize existing front loaders, trucks and employees. Because no increase in on-site equipment or employment is proposed, reclamation and mining

activities would not occur simultaneously on a given day or they would operate at lower levels.

Barges importing soil would implement Beat Management Practices to minimize the potential for spillage of soil through barge fence openings into the water. Practices would include: temporary closures at unused ramp openings during unloading operations; temporary placement of flexible or rigid dikes at openings during unloading operations; and, unloading using normal careful and safe techniques that pull material away from fences during unloading operations.

5. All soil imported to the site for reclamation would be material consistent with the provisions of the Clean Soil Acceptance Policy. As indicated in the Clean Soil Acceptance Policy included as *Appendix VI* to the Draft and Final EIS, testing of soil prior to use on the site for reclamation would utilize the NWTPD-Dx test which tests for total petroleum hydrocarbons and diesel, and Total Metals (RCRA 8) which tests for Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium and Silver. Please refer to *Appendix VI* of this Final EIS for detail.

Proposed mining and reclamation activity would follow the conditions outlined under the NPDES permit. The elements outlined in the Stormwater Pollution Prevention Plan, Erosion and Sediment Control Plan and Stormwater and Process Water Monitoring Plan established for the quarry would be implemented to reduce erosion and turbidity impacts. As outlined in *Appendix I* to this Final EIS, source control best management practices recommended for the site may include the construction of rip rap channels and check dams, in addition to, benching, hydroseeding and mulching fill slopes.

6. Comment acknowledged. Please refer to response to comment 2 of this letter.
7. Comment acknowledged. Please refer to the *Groundwater* section and *Appendix I* of this Final EIS for (1) an expanded description and analysis of the hydrogeologic framework at and in the immediate vicinity of the Mats Mats quarry site, (2) and expanded analysis of potential groundwater impacts, and (3) proposed mitigation measures.
8. A literature search was conducted for “similar existing mines close to saltwater which have not produced adverse seawater intrusion consequences”. Additional technical reports or documentation of groundwater impacts associated with similar sites directly applicable to the Mats Mats Quarry hydrologic environment were not identified in the literature search. Refer to *Appendix I* for additional detail.
9. Comment acknowledged. The cited proposal of 50 gpm for the completion of a supplemental hydrogeologic evaluation as a potential mitigation measure has been deleted from the Final EIS. Mitigation measures associated with potential impacts to offsite groundwater wells are described in the *Groundwater* section and *Appendix I* of this Final EIS. As described in these sections, a seepage rate of 10 gpm has been defined as the revised threshold for mitigation measures (pressure grouting). Seepage in the mine walls would be estimated from visual inspections conducted by mine personnel (superintendent). It is proposed that oversight of the Groundwater Monitoring Program implementation be conducted by the Washington State Department of Natural Resources.

10. Monitoring wells would be completed in the mine buffer area along the southern portion of the site. The primary purpose of the wells would be to monitor water levels and evaluate any changes in groundwater elevations during mining. The wells would be completed to a minimum of 5 feet below the proposed mine depth under the *Proposed Action*. Based on understanding of the hydrogeologic conditions at and in the vicinity of the quarry, regional groundwater flow is from west to east, with recharge in the upland areas west of Mats Mats. The quarry site is cross-gradient to the domestic wells south of the site, and the east-west trending basalt flows form a hydraulic barrier to north-south groundwater flow. Please refer to the updated *Groundwater* section and *Appendix I* of this Final EIS for a more detailed presentation of the regional and site-specific hydrogeologic conditions, and the potential sources of water supply for the nearby offsite domestic wells. As described in the *Groundwater* section and *Appendix I*, brackish water seeping into the active mine area could result in some localized temporary changes to the freshwater/saltwater interface beneath the quarry area, although there would be no significant impacts caused by anticipated changes in the freshwater/saltwater interface (mixing zone). Please also refer to the response to comment 13 of this letter (below) for additional discussion of the freshwater/saltwater interface with respect to groundwater monitoring concerns.
11. Under the proposed Groundwater Monitoring Program, several monitoring wells would be completed in the buffer area south of the quarry. Water levels and chloride concentrations would be monitored during mining at the site. Please refer to *Appendix I* and *Appendix IX* of this Final EIS for specific details. Based on current understanding of hydrogeologic conditions beneath and immediately adjacent to the site, installing monitoring wells to depths slightly greater than the proposed mine limits would be adequate for evaluating the risk of potential impacts to groundwater south of the site.
12. Water level data would be collected in the monitoring wells with continuously recording pressure transducers and data loggers during all phases of mining. Groundwater samples would be collected and analyzed for chloride and nitrate on a regular basis. Please refer to the revised groundwater monitoring plan presented *Appendix IX* of this Final EIS for specific details.
13. Analysis and interpretation of the regional and site specific hydrogeologic conditions indicates the saltwater/freshwater interface occurs as a coastal wedge beneath the Mats Mats Peninsula. The Ghyben-Herzberg relationship is applicable to unconfined coastal aquifer systems under steady state conditions, and does not account for vertical head gradients, vertical flow, or aquifer anisotropy. The basic equation also assumes that the height of the fresh groundwater is above sea level. Although the Ghyben-Herzberg relationship likely generally applies to areas of the Mats Mats peninsula south of the quarry site, it does not appear to directly apply to the basalt aquitard beneath the site based on the following: (1) groundwater levels are lower than mean sea level in areas of the mine located below sea level; (2) the likely anisotropic groundwater flow in the basalt aquitard caused by the physical and hydraulic characteristics of the multiple basalt flows; (3) most of the groundwater in fractures or faults likely flows under confined flow conditions. However, the implied conclusion that the depth of the pre-mining regional freshwater/saltwater interface is dependent on the relative changes in the height of the fresh groundwater elevations above sea level is acknowledged. Refer to response to comment 16 of this letter for additional information.

The magnitude and timing of the changes to the freshwater/saltwater interface beneath the quarry would likely be less than theoretical estimates based on the following: (1) the extremely low hydraulic conductivity and storage of the basalt aquitard; and (2) the phased approach to mining and reclamation, resulting in additional groundwater recharge from water accumulating in the reclamation backfill material. Some seepage of saline or brackish water is anticipated to occur through the walls of the mine located below sea level, resulting in a layer of brackish water overlying the fresh groundwater in the basalt aquitard. Because the quarry site is located in an area of regional groundwater discharge, the fresh groundwater occurring in the basalt aquitard at depths near or lower than mean sea level would have an upward vertical flow component. Anticipated changes to the freshwater/saltwater interface are described in the updated *Groundwater* section and *Appendix I* of this Final EIS.

The increased marine seepage and resulting changes to the freshwater/saltwater interface impact would be primarily limited to mine operations. The east-west trending basalt flows form an effective hydraulic barrier to north-south groundwater flow, and any changes in groundwater conditions beneath the site are not expected to impact groundwater conditions south of the quarry. Therefore, the proposed monitoring program is not focused on the anticipated minor changes to the freshwater/saltwater interface occurring at depths that greatly exceed the proposed mining limit. It is anticipated that most of the changes in groundwater chemistry would be the result of brackish or saline water from marine seepage mixing with the various sources of fresh water ponded at the base of the quarry, thereby forming a relatively thin layer of brackish water at the base of the quarry and within the subdrill zone. The revised monitoring program presented in *Appendix IX* of this Final EIS is designed to monitor potential impacts to groundwater elevations and chemistry at maximum depths corresponding to the bottom of the subdrill zone. This maximum depth is either greater than, or approximately equivalent to, the maximum depths of the off-site wells located within a distance of about 2,000 feet of the southern mine limits of the quarry according to data provided in the available water well reports.

14. Please refer to response to comment 13 of this letter above.
15. Refer to the groundwater monitoring plan presented in Appendix I and Appendix IX of this Final EIS for discussion concerning sampling frequencies, data evaluation, and action levels. Sampling of nearby domestic wells are not included in the proposed groundwater monitoring program because of: (1) the inherent difficulties in sampling domestic wells given the various piping, pump apparatus and pressure tank/treatment units that could be present; (2) unknown or imprecise well construction details; and (3) other potential sources of chloride and nitrate. Existing monitoring well EB-33 would be utilized as a background monitoring point for evaluating water quality characteristics near the offsite domestic supply wells.
16. Comment acknowledged. Based on comments received on the Draft EIS, the Groundwater Monitoring Plan has been updated. A primary change to the Groundwater Monitoring Plan is the provision for additional monitoring wells south of the quarry limits and revisions to the contingency planning and response process (please refer to *Appendix IX* and response to comments 10, 11 and 12 of this letter for additional detail and Response to Letter 4, Jefferson County, comment 1). The formation of a Water Quality Monitoring Committee is not included in the revised Groundwater Monitoring Plan.

The Groundwater Monitoring Plan has been revised to assign oversight of Monitoring Plan implementation to the Washington State Department of Natural Resources (DNR) and Jefferson County. The final scope of the Plan would be approved by the DNR and Jefferson County during the permit review process. A qualified consultant selected by Glacier, and approved by DNR and Jefferson County, would conduct the monitoring and prepare the reports. At Glacier's expense, a qualified consultant jointly selected by DNR and Jefferson County, and approved by Glacier, would review the reports. If contingency planning becomes necessary, that consultant would also, at Glacier's expense, assist these agencies in working with Glacier to develop contingency response actions

If the permitting agencies and Glacier Northwest cannot reach a consensus, then the permitting agencies would determine the response. DNR and/or Jefferson County would have the authority, as a condition of permits issued to Glacier, to require Glacier to undertake reasonable response actions deemed necessary by the permitting agencies. A contingency response action would be implemented as determined by the contingency planning process.

A contingency plan would be prepared to remedy the "problem" identified during the problem recognition process. The contingency plan describes actions that Glacier would take to resolve the problem, the schedule for taking response actions, and the collection and interpretation of monitoring data used to determine whether the contingency response has resolved the problem. As an example, contingency response actions may include but are not limited to:

- Stopping mining in a portion of the quarry.
- Pressure grouting all exposed rock fissures within an area of concern.
- Monitoring fissures for groundwater seeps into the mine.
- Increasing the frequency of groundwater reporting in the monitoring wells.
- Revising the mining and/or reclamation activities at the quarry.
- Constructing an on-site ground water recharge system to maintain an effective hydraulic barrier between Glacier Northwest's property and the off-site supply wells.
- Providing an alternative water supply source.
- Using a decision matrix approved by the regulatory agencies to determine whether the objectives of the contingency response are achieved.

Because a contingency plan does not identify specific actions to be taken by a party in the same way as a reclamation plan, the monetary commitment of a bond cannot be tied to actions in a contingency plan in the same way that it can be tied to the required actions in a reclamation plan. The key difference is that while the actions identified in a reclamation plan *must* be taken, the potential actions identified in a contingency plan will only be taken if unforeseen and unanticipated impacts occur. Because a bonding company cannot make financial commitments about unspecified and likely unnecessary actions, they are unlikely to provide bonds for a contingency plan. Glacier Northwest would maintain general liability insurance coverage in an amount sufficient to cover potential contingency actions.

In addition, A Neighborhood Water Supply Policy, supplementing the Groundwater Monitoring Program (Program), would be implemented to provide water as quickly as

possible to participating neighbors to the south of the quarry should the neighbors suspect that quarry operations have affected their wells. Because the contingency and response process of the Program could take time, the Neighborhood Water Supply Policy would ensure that residents have water during the contingency planning and response process. A copy of the proposed Neighborhood Water Supply Policy is presented in *Appendix XIV* to this Final EIS.

17. Please refer to response to comment 16 of this letter.